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Dated 23 July 2003

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19JUL02 E734806-1 [redacted]
P01/7700 0.00-0216767.4

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The Patent Office

Cardiff Road
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NP9 1RH

1. Your reference

   31.28.GB

2. Patent application number
   (The Patent Office will fill in this part)

   0216767.4

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

   UCB, S.A.
   Allée de la Recherche 60, B-1070 BRUSSELS (Belgium)

   Patents ADP number *(if you know it)*

   84 287 160 01

   If the applicant is a corporate body, give the country/state of its incorporation

   Belgium

4. Title of the Invention

   Coloured Labels

5. Name of your agent *(if you have one)*

   Martin KIRK

   "Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

   Martin KIRK,
   c/o Neil DUTTON,
   UCB FILMS Plc., Station Road, Wigton, Cumbria CA7 9BG, United Kingdom

   Patents ADP number *(if you know it)*

   8123580001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

   a) any applicant named in part 3 is not an inventor, or
   b) there is an inventor who is not named as an applicant, or
   c) any named applicant is a corporate body.
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Patents Form 1/77

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Continuation sheets of this form	
Description	11
Claim(s)	3
Abstract	1
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Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	
Request for preliminary examination and search *(Patents Form 9/77)*	
Request for substantive examination *(Patents Form 10/77)*	
Any other documents *(please specify)*	

11. I/We request the grant of a patent on the basis of this application.

Signature: Martin KIRK

Date: 19th of July 2002

12. Name and daytime telephone number of person to contact in the United Kingdom: Dutton Neill, UCB Films Plc. 016973 41591

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COLOURED LABELS

The present invention relates to the field of labels especially labels made from translucent biopolymeric films fixed to an article with an aqueous adhesive applied thereto (so-called wet glue labels).

Labels made from thermoplastic films have been conventionally fixed onto an article with pressure sensitive adhesives (herein denoted as PSA) pre-coated onto the label facestock. Such label films include polyolefins, e.g. biaxially oriented polypropylene - BOPP). A PSA label facestock is dispensed from a release liner onto the article to be labeled. An alternative labeling method often used with a paper labels is to use a separate adhesive dispersed in an aqueous medium. The adhesive is applied as the label is fixed to the article. These are often referred to as wet glue labels but can also be called cold glue labels or just glue labels.

The market for alcoholic beverages such as beer, wine or spirits is more and more competitive and breweries need to find ways of capturing their audience and enticing them to purchase their product. Packaging is a major part of the promotional mix especially at point of sale in supermarkets and the drive for differentiation amongst the manufacturers is furious.

Recently a 'no-label' appearance has become fashionable for PSA labels as retailers have found many advantages from this new form of shelf appeal. The appearance of no-label is achieved by applying a clear transparent label to the article. A further advantage of a clear label is that it can be coated (e.g. printed or metallised) completely or partially on its reverse side (i.e. the "interior" side to be adhered to the article). Thus for example printing can been seen though the transparent label and appears to be directly applied to the article hence the term "no-label look". Such interior coats are better protected from wear and tear (rubbing, attack by solvents etc) as they are not on the exterior of the article.

However due to the process used to apply a wet glue label , the conventional transparent plastic films (OPP, polyester- PE, polyethylene phthalate - PET) currently used in the PSA market have various disadvantages when used as the facestock for a transparent wet glue label. The properties of these thermoplastic films are different from the paper labels used on conventional wet glue machines. For example thermoplastic films have a high barrier to moisture (they are not semi-permeable to water) and this causes a wet glue to take longer to dry (and hence more time for the label to fix in place) which can be disadvantageous on a high speed labelling line or where precise location of the label on the article is required (e.g. to keep in register for high speed printing). Thus thermoplastic films are not an ideal replacement for a paper label on a conventional production line set up to apply a wet glue

label to an article such as a bottle. Aqueous coatings are also not easily compatible with and do not adhere well to such thermoplastic films which are often hydrophobic without further surface treatments.

The substrate conventionally used to prepare wet glue labels is paper which is not transparent. Thermoplastic films are transparent but because of the previous stated disadvantages with thermoplastic films and wet glue coatings, it has been necessary to use pressure sensitive adhesives to provide an article with a no look label having acceptable performance. Thus manufactures currently using labelling equipment for paper wet glue labels are faced with a significant capital outlay and disruption to change the to equipment compatible with pressure sensitive labels if they wish to move to a clear-label look.

The applicants co-pending application PCT/EP02/02726 describes use of wet glue method to apply a clear biopolymeric label (such as a cellulose film) to a transparent article to achieve a clear -label look without PSA. This method can use existing machinery suitable for paper wet glue labels yet allows use of biopolymeric labels which have various advantages over paper. The biopolymeric labels can be transparent or translucent to achieve a clear-label look which can then be interior coated to protect the coat. A wet glue on a biopolymeric substrate can also dry in situ in a reasonable time without the need to use exotic coatings. This method now provides an alternative route to a clear-label look for manufacturers without the disadvantages of changing an existing label line from wet glue to PSA. The contents of PCT/EP02/02726 are hereby incorporated by reference.

However surprisingly the applicant has found that there are still issues that remain to provide an acceptable no-label appearance using a wet glue label compared to a PSA label.

PSA labels have the pressure sensitive adhesive pre-applied during the production of the label stock. In contrast the wet glue process requires that a wet adhesive is applied in situ to the label. The wet glue is applied to a glue roller then transferred to rubber covered palettes which transfer the glue onto the reverse of the label. In turn, the label is applied to articles such as glass or PET bottles at typical output speeds between 300 and 500 plus articles labelled per minute. At these line speeds and under the above conditions the applicant has found that the adhesive transfer characteristics of wet glue have been difficult to optimise to achieve a satisfactory no-label appearance of a wet glue label on a bottle comparable to the no-label appearance of a conventional PSA label.

For example the applicant has found while a label of a clear cellulose film can be applied to a clear flint glass bottle using a wet glue to achieve an acceptable appearance unexpectedly

this is not the case when coloured bottles are used. Wet glue labelling coloured green , amber, brown or black glass bottles with clear cellulose labels does not achieve a satisfactory no-label appearance. The clear label does not blend-in sufficiently with the appearance of the coloured glass surfaces of the bottle. Without wishing to be bound by any mechanism the applicant believes that due to the slower drying rate and streaking of the wet glue compared to a PSA there will be more micro- bubbles and under label defects compared to a PSA label. What is surprising is that these blemishes can more readily be seen with a clear transparent label on translucent coloured article (such as a coloured glass or PET bottle) thus spoiling the illusion of a no-label appearance. Again without wishing to be bound by any mechanism the applicant speculates that this may be due to non optimal optical contrast properties in the label bottle assembly.

Therefore if this unexpectedly observed problem is addressed it would enable a satisfactory or improved no-label appearance be achieved by a wet glue label on a wider range (preferably any) colour or luminosity of articles to be labelled, more preferably where the article (as well as the wet glue label) is translucent or transparent.

Although the disclosure herein relates mainly to biopolymer wet glue labels it will be appreciated that if a satisfactory means can be found to apply wet glue to other transparent or translucent facestock (e.g. thermoplastic film such as polyolefins for example BOPP) then the present invention applies equally to these substrates as the problem identified and solved herein arises mainly due to the nature of the wet glue label process compared to the PSA.

Various documents exist which teach that optical properties of a label facestock or label adhesive may be modified.

EP 0664534 A (Fuji Seal) discloses a heat shrinkable label (optionally made from a film of ethylene-vinyl acetate copolymer with an amount of vinyl acetate in the range of 1 to 6% by weight) where the refractive index of the label is in the range of 1.512 to 1.516 in the circumferential direction when fitted to the container, and is in the range of 1.513 to 1.520 in the vertical direction of the container, so that it is even more unlikely that wrinkling, slackening, etc. occur on a surface of the label when heated, as compared with a conventional label made of a polyethylene film. This deals with a completely different problem faced by a separate type of label to that of the present invention.

Some documents in the field of PSA labels have teach that specific refractive index values for a PSA used in a transparent label.

EP 1124213 A (Heineken) discloses a clear PSA label where the PSA layer has at least one inorganic particulate material having a particle size not exceeding 50 µm and having a refractive index of between 1.4 and 1.6. This is stated to improve the transparency of the label of the bottle.

WO 0130933 A (3M) discloses PSA labels where the pressure-sensitive adhesive having a refractive index of at least 1.48. The pressure-sensitive adhesives comprise at least one monomer containing a substituted or an unsubstituted aromatic moiety.

References in the field of PSA labels are clearly not relevant to the problem discovered by the applicant in the field of wet glue labels.

US 6306242 (Dronzek) discloses a method of applying a polymer label to an article with a hydrophilic adhesive by curing the label in situ after it has been applied to the article. On col. 5 lines 30 to 32 (and again on col. 8 lines 46 to 49) the polymeric substrate for this hydrophilic adhesive is stated to include "*clear, opaque or colored polypropylene*". This document does not appreciate the particular problem faced with achieving a no-label look using wet glue with a transparent label as for example no distinction is made between clear and coloured labels.

It is an object of the invention to solve some or all of the problems identified herein.

In general the following subscripts are used herein and in the claims to denote various colour space parameters and measurements made herein:

"L+A" denotes a measurement made through a labelled region of an article i.e. in transmitted light through the combination of both a translucent or transparent label in situ (including its wet glue) and the translucent or transparent article (or translucent or transparent sub region thereof) so labelled,

"L" denotes a measurement made in transmitted light through a plain (i.e. unprinted) translucent or transparent label including (unless otherwise specified) through the wet glue applied to the side which will be the label interior side when on the bottle; and

"A" denotes a measurement made in transmitted light through translucent or transparent article (or translucent or transparent sub region thereof) unlabelled and without any wet glue applied.

Unless otherwise specified measurements are taken from the front side of the sample as seen when the sample is located on the labelled article.

In one method used in accordance with the present invention differences are measured between the labelled and unlabelled articles directly.

In this method ΔC and ΔH are defined in Equations 1, 2 and 3 as follows (and where L*a*b* are measured directly from the relevant sample):

$$\Delta C = (\Delta a^2 + \Delta b^2)^{1/2} \quad \text{Equation 1}$$

in which Δa is $(a^*_{L+A} - a^*_A)$; and Δb is $(b^*_{L+A} - b^*_A)$

$$\Delta H = \tan^{-1}(b^*_{L+A}/a^*_{L+A}) - \tan^{-1}(b^*_A/a^*_A) \quad \text{Equation 2}$$

$$\Delta L = L^*_{L+A} - L^*_A \quad \text{Equation 3}$$

Preferably and independently in each case:
the modulus of (ΔC) is less than about 10, more preferably about zero.
the modulus of (ΔH) is less than about 10, more preferably about zero.
the modulus of (ΔL) is less than about 10, more preferably about zero.

Values of ΔC and ΔH have been selected by experiment to define the region of CIE colour space for a label with respect to an article which leads to an acceptable no-label look when that label is applied by a wet glue to the article.

The value of ΔL is selected as for a given matched colour a lower luminescence as it has been found that this too helps to disguise visual blemishes caused by defects in the wet glue layer. There is also an upper value of ΔL otherwise the invention would relate to a black label on a clear bottle which is also unacceptable for a no-label look.

Using the second method the following values where determined for a wet glue cellulose label (such as that of Example 1) applied to various glass bottles.

	ΔL	ΔC	ΔH
Clear Bottle / Clear Label	0.7	1.12	1.2
Brown Bottle / Clear Label	0.7	0.76	4.54
Brown Bottle / Blue Label	6.3	10.83	34.33
Brown Bottle / Brown Label	8.1	3.52	-6.9

CIE L*C*H* colour space differences (cylindrical co-ordinates corresponding to the CIE Cartesian colour space L*a*b*) are measured conventionally herein as the difference between the labeled article and the unlabelled article measured in transmitted light through the translucent sample.

Each of the above parameters used herein is otherwise measured and/or defined as set out in the Commission Internationale d'Eclairage (CIE) standard CIE94 or by analogy with the methods used in this standard. The measurements were performed under standard reference test conditions as defined in CIE94 (except as modified herein) namely: CIE D_{65}, CIE 10^0 Observer, 1000 lx illuminance, gray background, minimal specimen separation, homogeneous specimen structure, 0 to 10 ΔE, and normal colour vision and measurements made in transmitted light as defined herein.

In an alternative or additional method used in accordance with the present invention differences are measured between the coloured sample and a clear standard (label, labelled article and unlabelled articles).

As used herein the colour differences for each respective sample may be denoted generically as ΔE^* which is defined herein in Equation 4 as follows:

$$\Delta E^* = [(\Delta L^*)^2 + (\Delta C^*/S_C)^2 + (\Delta H^*/S_H)^2]^{1/2}$$

Equation 4

in which

ΔL^* represents the difference in lightness between the sample and a clear transparent standard;

ΔC^* represents the difference in chroma between the sample and a clear transparent standard;

ΔH^* represents the difference in metric hue between the sample and a clear transparent standard;

S_C represents a chroma weighting function defined as:

$$S_C = 1 + 0.045C^*$$

S_H represents a hue weighting function defined as:

$$S_H = 1 + 0.015C^*$$

where C^* denotes the chroma co-ordinate in colour space (cylindrical co-ordinates measured as a perpendicular distance from the lightness axis L^*) of the relevant sample.

All values for $L^*C^*H^*$ are measured (or calculated from $L^*a^*b^*$ values measured) in transmitted light through the sample and as defined herein and in CIE94.

The standard used to determine colour difference is the corresponding and otherwise identical sample (i.e. label, article or labeled article) which is uncoloured (i.e. is clear and transparent).

As used herein a colour difference ratio in transmitted light (also denoted R_{trans}) may be defined in Equation 5 as:

$$R_{trans} = \frac{2 \times (\Delta E_{L+A})^{1/2}}{(\Delta E_L + \Delta E_A)}$$

Equation 5

where

ΔE_{L+A} denotes colour differences for the translucent region of the article with label attached thereto, as the sample;

ΔE_L denotes colour differences for the label, as the sample; and

ΔE_A denotes colour differences for the translucent unlabelled article (such as a transparent bottle), as the sample.

Preferably for optimal colour matching the modulus of transmitted colour ratio (R_{trans}) is greater than 0.9 preferably is substantially about 1.0.

The transmitted colour ratio (R_{trans}) which uses a composite measurement for the label plus article together can be distinguished from results obtained from more conventional colour matching which is based on reflected light. Two transparent coloured objects side by side may look the same, but when stacked on top of each other the colour can change and as such the methods described herein are superior in identifying and selecting that colour of wet glue label which is required to achieve an acceptable no-label appearance on a translucent article of given colour.

Values for R_{trans} and the equations herein can be used to determine optimal colour values for a label (ΔE_L) to achieve a satisfactory no-label look for a given article of specified colour values (ΔE_A) and given the other values specified herein as optimal for example for parameters such as ΔC, ΔH and ΔL.

The present invention relates to the surprisingly discovered need to minimise the visual sensation of contrast between the label and the bottle and its contents. Contrast can arise from differences in luminance. The applicant has surprisingly discovered that the acceptability of a no-label appearance depends on the intensity of scattered/reflected light from and transmitted light through the sample. Contrast can also be at constant luminance due to differences in colour. Contrast can thus be defined in terms of standard (CIE Lab) measurements of colour and luminance (i.e. L a and b values) more particularly the differences between bottle and contents and film where the optimum would be with the differences are as small as possible i.e. approach zero.

The applicant has also unexpectedly discovered that to a first approximation other parameters of the label or bottle (such as refractive indices, amount of reflection or difference between bottle surface and label or spectral analysis of glass versus label film) are less important to achieve the no-label appearance and need not be considered here.

Therefore broadly in accordance with the present invention there is provided a coloured, translucent polymeric label which is capable of being fixed to a pre-selected coloured translucent region of an article by a wet glue process to achieve a non-label look on the article, characterised in that the colour parameters measured in CIE colour space of each of the label, labelled article and un-labelled article together satisfy conditions (a) and/or (b)

(a) (i) the modulus of (ΔC) is less than about 10, more preferably about zero, where:

$$\Delta C = (\Delta a^2 + \Delta b^2)^{1/2} \quad \text{(Equation 1)}$$

(ii) the modulus of (ΔH) is less than about 10, more preferably about zero, where:

$$\Delta H = \tan^{-1}(b^*_{L+A}/a^*_{L+A}) - \tan^{-1}(b^*_A/a^*_A) \quad \text{(Equation 2); and}$$

(iii) the modulus of (ΔL) is less than about 10, more preferably about zero; where

$$\Delta L = L^*_{L+A} - L^*_A \quad \text{(Equation 3)}$$

(b) the modulus of transmitted colour ratio (R_{trans}) is greater than 0.9 preferably is substantially about 1.0, where

$$R_{trans} = \frac{2 \times (\Delta E^*_{L+A})^{1/2}}{(\Delta E^*_L + \Delta E^*_A)} \quad \text{(Equation 5)}$$

and where in each case $\Delta E^* = [(\Delta L^*)^2 + (\Delta C^*/S_C)^2 + (\Delta H^*/S_H)^2]^{1/2}$ (Equation 4)

It will be appreciated that the any suitable transparent and/or translucent wet glue label facestock in combination with any suitable wet glue may be coloured as described herein to achieve a no-label appearance. Preferred wet glue labels that can be coloured as desoribed herein are those preferred, embodied and exemplified in PCT/EP02/02726 but optionally any transparent and/or translucent labels also described in US 6306242 may also be coloured as described herein. More preferred facestock is cellulose, BOPP and/or polylactic acid film, most preferred is cellulose film.

Unless otherwise specified herein where necessary the wet glue used to obtain the colour space values herein is the conventional wet glue described in the examples herein (Label 1).

The method of colour matching as described herein can be achieved by any suitable known method to colour a label for example one or more of the following;.
colouring the film directly by incorporating dyes or pigments therein.
applying translucent coloured lacquers to either or both surfaces by any suitable application method;
colouring the surface of the substrates with pigmented or translucent inks by any suitable print process; and/or.
colouring a conventional clear wet glue in order to produce coloured translucent adhesive used in conjunction with a clear film.

It will be further appreciated that the total desired colour of the label plus wet glue may be achieved by a partial combination from any of the above (or other) methods and/or by selection of a specific available colour of any suitable commercially available coloured film from a product range, should the known the film be measured to have the desired colour space values as calculated herein.

The present invention of colour matching the label to the article shows some or all the following benefits (relative to a clear label) :
Improved merging of the edges of the applied labels especially seen with with brown glass bottles.
Improved masking of the micro bubbles trapped in the adhesive layer between the bottle surface and the inner face of the applied labels.
Improved masking of transferred marks or blemishes on the rubber plate, thus significantly widening the operating window with regard to surface defects or finish of the rubber application palettes used on a bottle line to transfer adhesive to the labels.
Improved opacity of surface printed white inks which allows labels to be printed by the off set Lytho sheet fed process currently used to print the bulk of paper wet glue labels
Elimination of the "wet T-shirt effect " seen when a single hit white ink is used as part of the label design colour palette.
The label can be precisely matched to an article of any colour so a no-label appearance can be achieved for a much wider range of articles.

Thus one aspect of the present invention provides a method of reliably and reproducibly predicting in advance the colour and/or luminosity required of a label film to achieve a no label appearance when said label is applied by a wet glue method to a translucent article of given colour and luminosity (defined by its position in CIE colour space). This is because the applicant has defined using the equations herein and parameter limits given herein for the

variables in said equations a region of colour space relative to the article which the applicant has found by trail and error is sufficient to disguise the blemishes which unavoidably result from the wet glue method (compared say to a PSA label) when the labelled article is viewed in transmitted through the translucent label- article assembly.

Further aspects, embodiments and preferred features of the invention are described in the claims.

The present invention will now be described in detail with reference to the following non limiting example which is by way of illustration only.

Labels

Cellulose label film was produced as follows:

Label 1

A production machine was set up in a conventional manner to produce regenerated cellulose film from the well known viscose method. The viscose used had a cellulose content of 9.3% and the resultant film had a substance of 30 grams per square metre.

A brown pigment can be added to the viscose stream to be absorbed into the regenerated film until the film web colour satisfied the equations herein with respect to previously measured colour space values for a brown glass bottle to be labeled. The bottle selected to colour Label 1 was a McEwans export beer bottle which previously was found to be difficult to achieve no-label appearance with prior art labels due to it being one of the darkest brown glass bottles available and it is filled with a very dark beer.

One side of the cellulose film was coated with a conventional coating of vinyl chloride / vinyl acetate copolymer at a coat weight of 65 g per m². A standard wet glue synthetic adhesive (50% water) was then applied to the same side as the copolymer during labelling by a conventional wet glue labelling apparatus.

The resultant film was translucent brown.

Comp A

A coated cellulose film was prepared identically to Example 1 except the pigment was omitted and the resultant film was clear and transparent and is available commercially from UCB under the trade mark Cellophane® 645 E711.

Comp B

A coated cellulose film was prepared identically to Example 1 except the a blue pigment used was not matched to the pre-selected brown bottle. The resultant film was blue and translucent.

Labelled bottles

Example 1 and Comp C to E

Each label (Label 1 and Comp A) was directly applied to the various glass bottles which apart from their colour were otherwise identical. The pre-selected brown bottle to which the brown label of Label 1 was matched is referred to below as "Brown Bottle". The label films were applied to the bottles in a conventional way using unmodified (or only trivially modified) conventional labeling equipment set up for wet glue paper labels, to achieve a transparent label thereon.

Using the method described herein (and in Equations 1 to 3) the following values were determined from experimental data for these labels applied to various glass bottles.

	ΔL	ΔC	
	ΔH		
Ex 1 = Brown Bottle / Label 1 (Brown, translucent cellulose label)	8.1	3.52	
Comp C = Brown Bottle / Comp A (Clear, transparent cellulose label)	0.7	0.76	
	4.54		
Comp E = Brown Bottle / Comp B (Blue, translucent cellulose label)	6.3	10.83	
	34.33		
Comp D = Clear Bottle / Comp A (Clear, transparent cellulose label)	0.7	1.12	
	1.2		

Of the above labelled bottles Example 1 where the label and bottle had been colour matched according to the invention gave a superior no-label appearance . On the Brown Bottle the matched translucent brown labels did not show the micro bubbles or under label defects to the same degree as for example a clear label on the same bottle (Comp A).

CLAIMS

1. A coloured, translucent polymeric label which is capable of being fixed to a pre-selected coloured translucent article or translucent region thereof by a wet glue process to achieve a non-label look on the article, characterised in that:
the colour parameters measured in CIE colour space of each of the label, labelled article and un-labelled article together satisfy conditions (a) and/or (b)

(a) (i) the modulus of (ΔC) is less than about 10, more preferably about zero, where:

$$\Delta C = (\Delta a^2 + \Delta b^2)^{1/2} \quad \text{(Equation 1)}$$

(ii) the modulus of (ΔH) is less than about 10, more preferably about zero, where:

$$\Delta H = \tan^{-1}(b^*_{L+A}/a^*_{L+A}) - \tan^{-1}(b^*_A/a^*_A) \quad \text{(Equation 2); and}$$

(iii) the modulus of (ΔL) is less than about 10, more preferably about zero; where

$$\Delta L = L^*_{L+A} - L^*_A \quad \text{(Equation 3)}$$

(b) the modulus of transmitted colour ratio (R_{trans}) is greater than 0.9 preferably is substantially about 1.0, where

$$R_{trans} = \frac{2 \times (\Delta E^*_{L+A})^{1/2}}{(\Delta E^*_L + \Delta E^*_A)} \quad \text{(Equation 5)}$$

and where in each case $\Delta E^* = [(\Delta L^*)^2 + (\Delta C^*/S_C)^2 + (\Delta H^*/S_H)^2]^{1/2}$ (Equation 4)

2. A label as claimed in any preceding claim, in which the label comprises a polymer film made from cellulose, a cellulose derivative, a polyolefin and/or polylactic acid.

3. A label as claimed in the preceding claim, in which the label comprises cellulose film or BOPP film.

4. A method of preparing a coloured translucent label that can be fixed by a wet glue on to a coloured translucent article or translucent region thereof to achieve a no-label appearance thereon the method comprising the steps of

(a) measuring the L*a*b* of the article or region thereof

(b) using Equations 1 to 3 and/or Equations 4 and 5 and the parameter limits given herein to calculating corresponding L*a*b* values required of a label.

(c) colouring a polymeric translucent label to have the L*a*b values calculated from step (b) where optionally the colouring method is selected from at least one of:

(i) colouring the label directly by incorporating dyes or pigments therein;
(ii) applying translucent coloured compositions to either or both label surfaces;
(iii) printing the surface of the label with pigmented or translucent inks; and/or
(iv) colouring a clear wet glue formulation to produce coloured translucent adhesive layer when the glue is applied to the label: and/or
(v) any combinations thereof which achieve the desired total colour space values

5. A method for preparing and/or applying a label to a coloured translucent article or translucent region thereof, the method comprising the steps of:
(a) coating a label as claimed in any preceding claim on at least one surface thereof with an aqueous composition with an adhesive dispersed therein;
(b) treating at least the opposite surface of the sheet, optionally both surfaces, to improve its printability,
(c) drying the film to remove excess water;
(d) applying the label to an article; and
(e) optionally drying the article to affix the label thereon.

6. A method of labelling a coloured translucent article or translucent region thereof with a wet glue label to achieve a no-label appearance thereon, the method comprising the steps of
(a) measuring the L*a*b* of the article or region thereof
(b) using Equations 1 to 3 and/or Equations 4 and 5 and the parameter limits given herein to calculating corresponding L*a*b* values required of a label.
(c) colouring a polymeric translucent label to have the L*a*b values calculated from step (b);
(i) colouring the label directly by incorporating dyes or pigments therein;
(ii) applying translucent coloured compositions to either or both label surfaces;
(iii) printing the surface of the label with pigmented or translucent inks; and/or
(iv) colouring a clear wet glue formulation to produce coloured translucent adhesive layer when the glue is applied to the label: and/or
(v) any combinations thereof which achieve the desired total colour space values
(d) applying the coloured label prepared in step (c) to the measured region of the article using a wet glue to achieve thereon a labelled article having a no-label appearance.

7. A label obtained or obtainable by a method as described in claim 4.

8. A label facestock comprising a label as claimed in any of claims 1 to 3 or 7 adjacent a release liner.

9. A labelled article where label has a no-label appearance thereon and where the article:

(i) is obtained or obtainable by a method as described in claim 5 and/or 6, and/or

(ii) comprises a label as claimed in any of claims 1 to 3 and/or 7 fixed thereto with an aqueous adhesive composition.

10. An article as claimed in claim 9, which comprises a coloured translucent glass or PET container.

ABSTRACT

There is described a coloured, translucent polymeric label which is capable of being fixed to a pre-selected coloured translucent region of an article by a wet glue process to achieve a non-label look on the article, characterised in that:

the colour parameters measured in CIE colour space of each of the label, labelled article and un-labelled article together satisfy conditions (a) and/or (b)

(a) (i) the modulus of (ΔC) is less than about 10, more preferably about zero, where:

$$\Delta C = (\Delta a^2 + \Delta b^2)^{1/2} \quad \text{(Equation 1)}$$

(ii) the modulus of (ΔH) is less than about 10, more preferably about zero, where:

$$\Delta H = \tan^{-1}(b^*_{L+A}/a^*_{L+A}) - \tan^{-1}(b^*_A/a^*_A) \quad \text{(Equation 2); and}$$

(iii) the modulus of (ΔL) is less than about 10, more preferably about zero; where

$$\Delta L = L^*_{L+A} - L^*_A \quad \text{(Equation 3)}$$

(b) the modulus of transmitted colour ratio (R_{trans}) is greater than 0.9 preferably is substantially about 1.0, where

$$R_{trans} = \frac{2 \times (\Delta E^*_{L+A})^{1/2}}{(\Delta E^*_L + \Delta E^*_A)} \quad \text{(Equation 5)}$$

and where in each case $\Delta E^* = [(\Delta L^*)^2 + (\Delta C^*/S_C)^2 + (\Delta H^*/S_H)^2]^{1/2}$ (Equation 4)

This provides a method for colour matching a label to a specific article such as a bottle to be labelled to provide a no-label appearance on the article.